

## WHAT IS CLAIMED IS:

1. An imaging system for generating an image of a planar segment of an object, said imaging system comprising:

5 an x-ray source that generates x-rays at first and second source points, said x-rays from said first and second source points passing through said object;

a planar detector comprising a plurality of photodetectors covered by a layer of scintillation material that converts x-rays into visible light, said planar detector being  
10 positioned to receive x-rays from said first and second source points after said x-rays have passed through said object; and

a controller that selects which of said source points generates said x-rays at any given time and that reads a first image formed by x-rays from said first source point and stored in a  
15 first portion of said photodetectors while a second portion of said photodetectors measures x-rays from said second source point to generate a second image that is stored in said second portion of said photodetectors

2. The imaging system of Claim 1 wherein said controller combines said first and  
20 second images to form an image of a portion of said object.

3. The imaging system of Claim 1 wherein said x-ray source further comprises a collimator for preventing x-rays generated at said second source point from reaching said first  
25 portion of said photodetectors.

4. The imaging system of Claim 1 wherein said x-ray source comprises:

an electron gun for generating a collimated beam of electrons;

30 a cathode layer that generates x-rays when bombarded by electrons from said electron gun; and

a deflection system for positioning said beam of electrons so as to strike said cathode layer at selected points thereon,

5 wherein said first and second source points correspond to first and second locations on said cathode layer.

5. The imaging system of Claim 1 wherein said controller resets a third portion of said photodetectors while said second image is being stored in said second portion of said photodetectors.